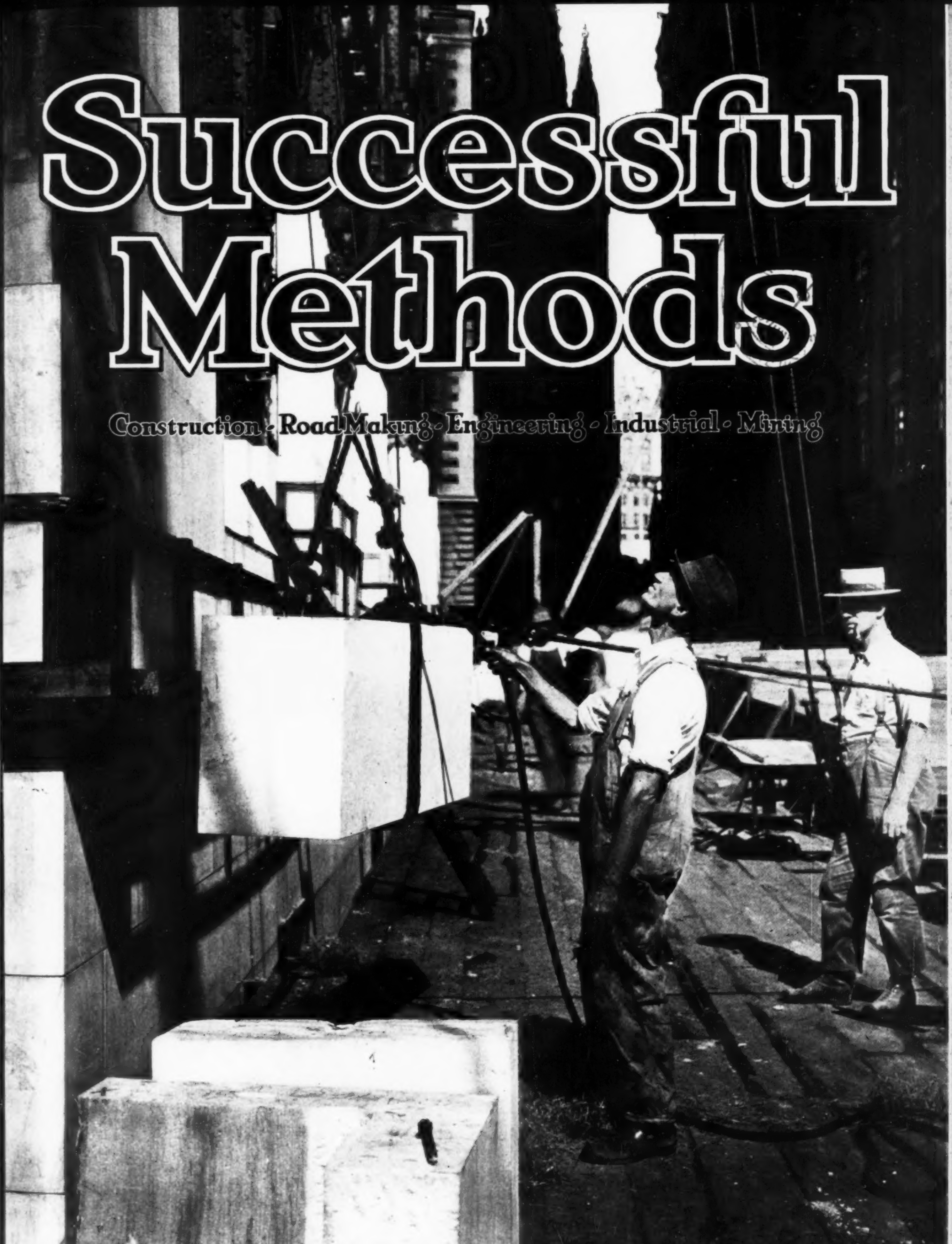
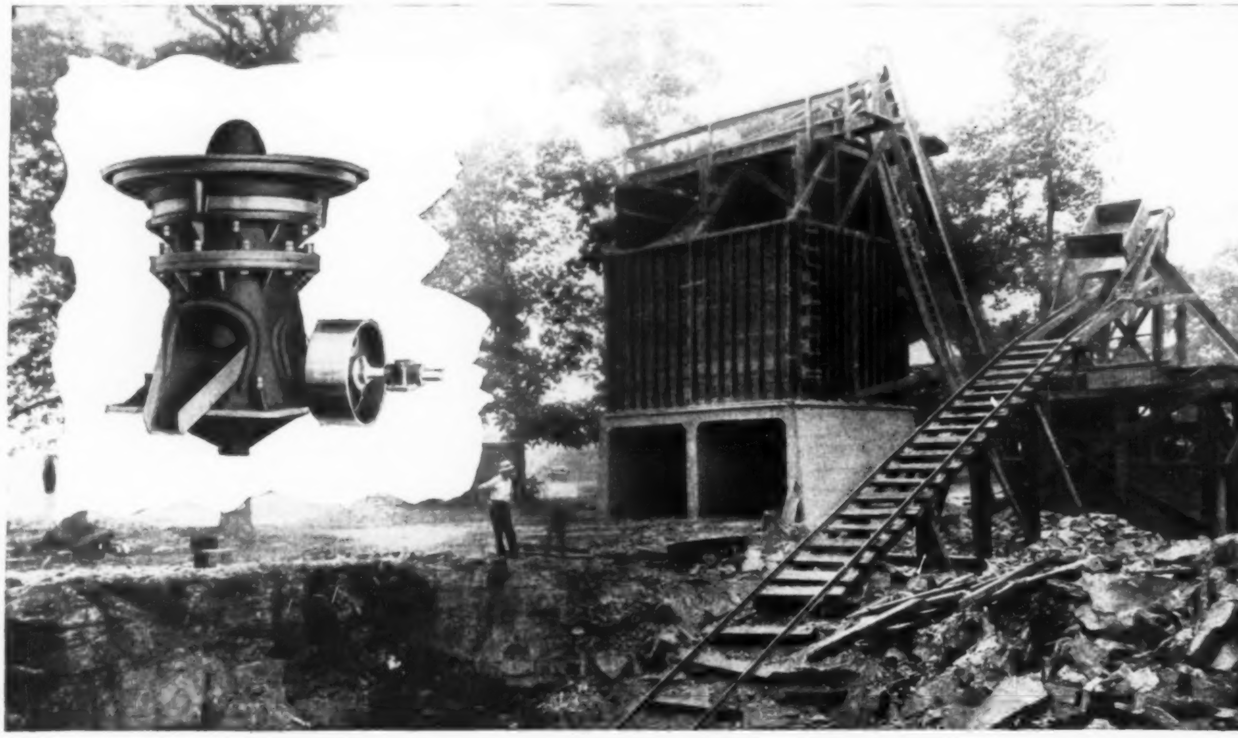
Successful Methods

Construction - Road Making - Engineering - Industrial - Mining



Vol. 3 September 1921 No. 9



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More Evening Up Necessary

LACK of uniformity of prices is beginning to be recognized as one of the biggest factors in holding up the overdue revival of business. Prices in some lines have gone to and below pre-war levels. Farm products, metals and various raw materials are at or under 1913 figures. Too many other goods, however, have come down comparatively little. Rents, railroad freight rates and most factors entering into operating costs are holding their own at high levels. Some classes of labor also still think they can command war-time rates, while the farmer gets 30 to 45 cents for his corn. It cannot be done.

Sooner or later the old common-denominator rule will work. War levels seem too low as the common denominator, but only time will tell where prices will stabilize. Meanwhile, the daily press and the trade papers print articles about high prices which cannot come down from an exalted height. The next day some big producer cuts loose, then down go the prices of everybody in the business. Automobiles are one good example; textiles are another. Incidentally, both of these lines are making an exceptionally good showing in volume of business done.

Even to suggest that the prices of all manufactured products that are still above a pre-war basis should be reduced at once would be absurd. Such a move would, in fact, be a catastrophe. For example, most lines of machinery already have been cut so far that there is no profit left to the maker. To reduce more now would mean bankruptcy. But numerous manufactured products, and particularly those for household consumption, will have to get into line with commodity and raw material prices.

High labor rates seem to be the key log in the jam. But there is no uniformity even in wages. Common labor is down considerably in most places. Farm labor is at nearly pre-war level. Factory workers in some lines have taken appreciable cuts. Railroad men and the building trades are the bad actors. They certainly are in for a drop; they are only foolish to try to stem the tide.

Anyone who is trying to maintain prices for his goods or his services that are out of line is kidding himself. Sooner or later the evening-up process will come. Until it is an accomplished fact, the construction industry, excepting road building and public improvements, must largely mark time. As soon as all business is on a comparable price basis many a big job that is held up now will go ahead.

Local Aggregate Supplies

DURING the last two years hundreds of local aggregate supplies have been developed. This recourse to materials near the job has resulted mostly from the unprecedented demand for materials for road work. It is evidently not a passing tendency, but appears likely to be extended to sections where such a policy previously has not been good business.

The shortage of railroad cars in 1918 and 1919 first seriously directed attention to the use of local materials in territories ordinarily dependent on large commercial plants for a supply. The car shortage also brought to the front the idea of using local materials in areas where there had not before been much demand for them. The absurdly high freight rates on sand, gravel and broken stone made effective later forced dependence on local supplies that had never before been considered practicable of development.

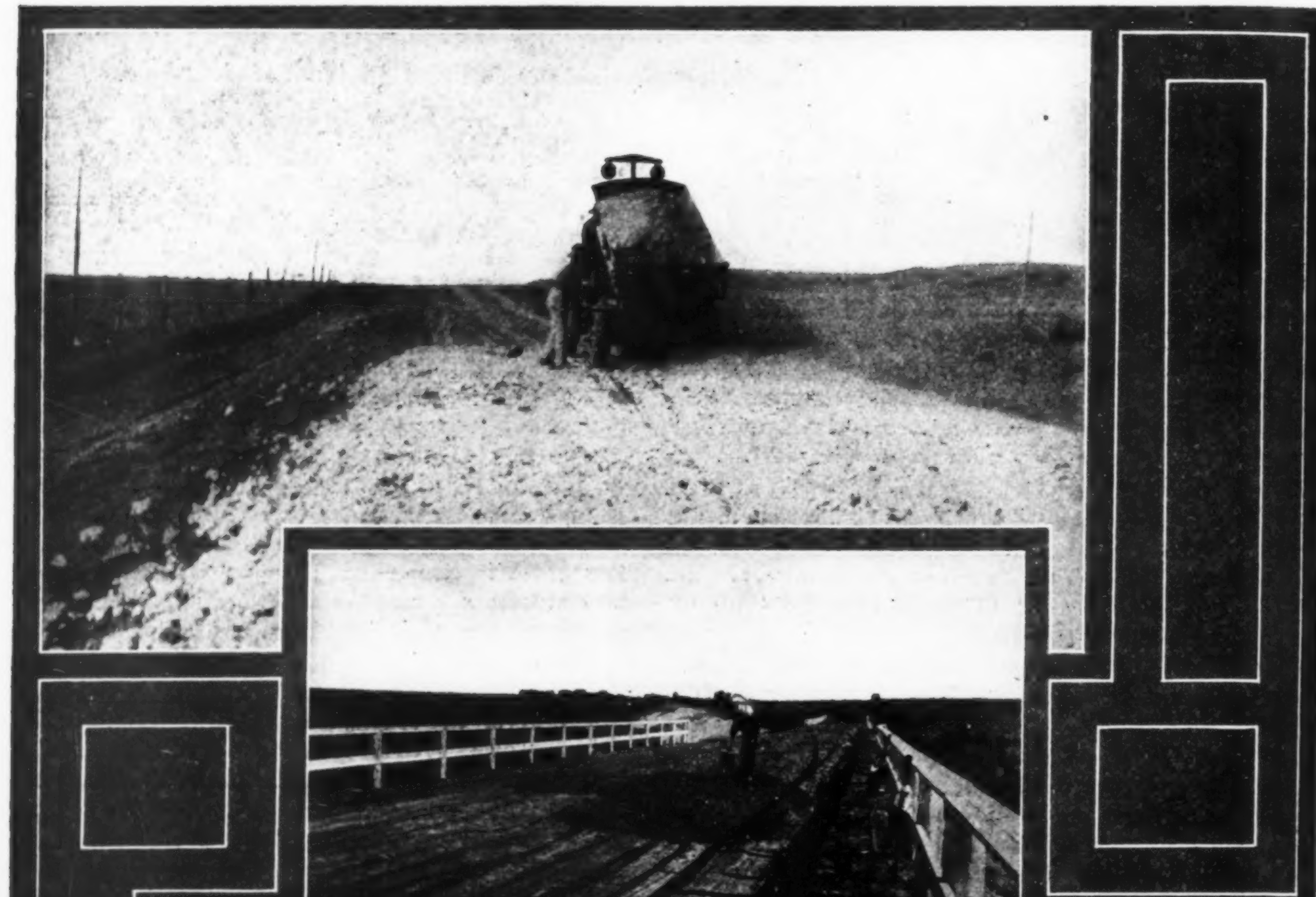
When thus put up against the problem engineers and contractors frequently have found satisfactory materials where they were not believed to exist. But only a start has been made in uncovering and utilizing materials close to the job. Conditions are bound to force more and more of such pioneering.

The present prospects are that the demand for sand, gravel and broken stone in 1922 will exceed anything ever previously known. Road building programs will be under way on a tremendous scale in several states in which not much of such work has as yet been done. In most of the other states where a large mileage of concrete roads has been built work will also evidently go ahead on a scale up to the previous record. Added to the demand thus created will be an almost certainly larger volume of general building and other construction than has been done this season.

Some relief from present railroad rates on sand, gravel and stone may come. Whatever it is will be slight. Besides, experiences show that in many cases the use of local materials cuts the expense of transportation so much that relatively high costs of production are practicable. Next year we shall, therefore, probably see an even more extensive development of local material supplies than occurred to date.

This does not mean that the commercial plants must go out of business. Those that are properly managed and that are reasonably accessible to a market, will likely not feel the competition of local development. In fact, many of the small plants opened up lately to furnish materials for nearby work already have secured business over considerable territory.

Road Building Methods

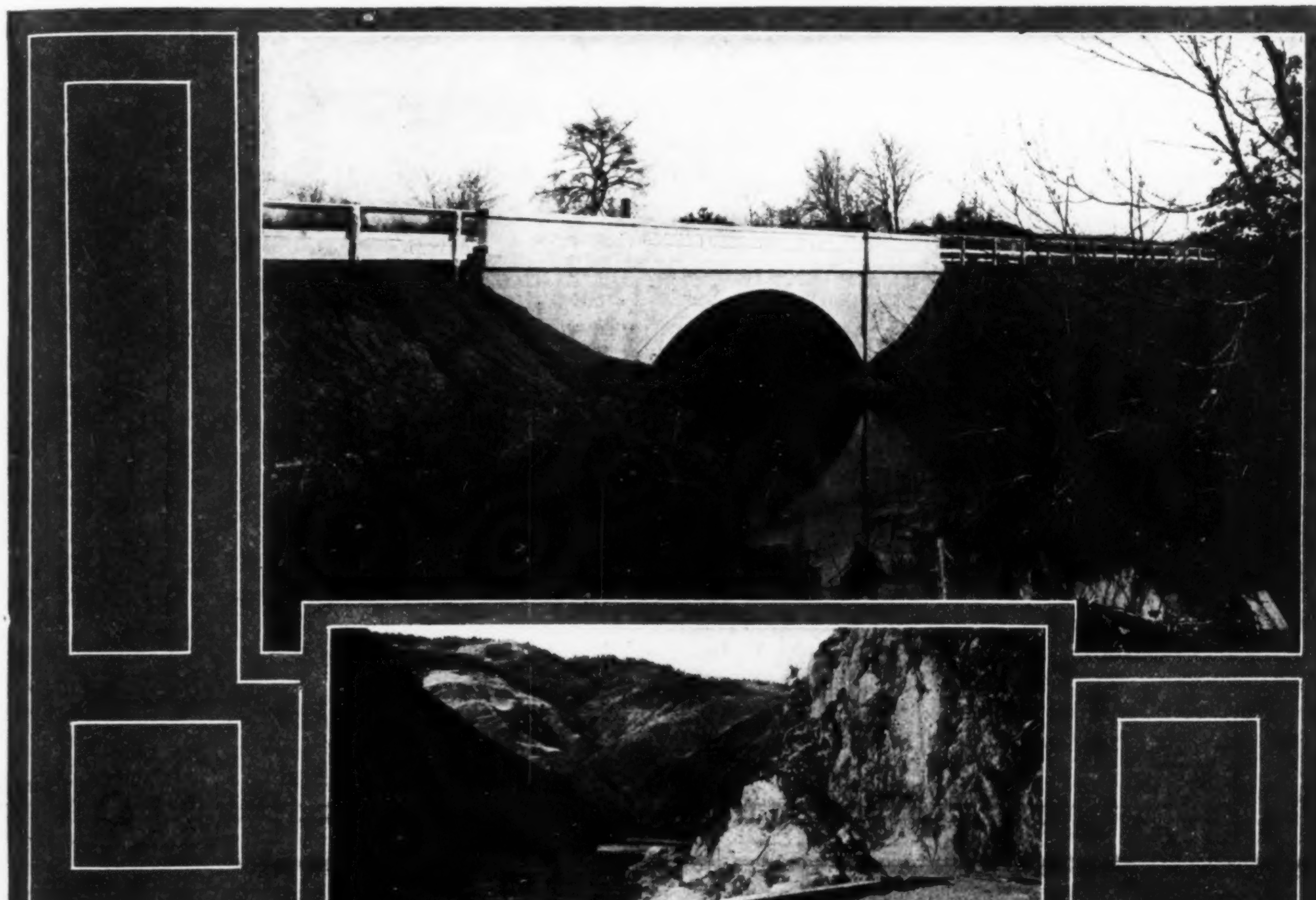


At the top—Surfacing a highway in New Mexico with caliche. This surfacing is 1 ft. thick, 22 ft. wide and 600 ft. long.

In the center—The man with a hand shovel is indispensable on a road job. This one is an employee of the North Dakota Highway Department.

At the bottom—Paving the Lincoln Highway with concrete in Illinois.

And the Finished Product



At the top—A reinforced concrete arch bridge with a 30-ft. span built recently by the Delaware State Highway Department.

In the center—The picturesque North and South Highway of which Idaho and its State Highway Department are justly proud.

At the bottom—How Michigan marks its state roads. A sign post on a trunk line.

THE BIGGEST HOUSE IN THE UNITED STATES

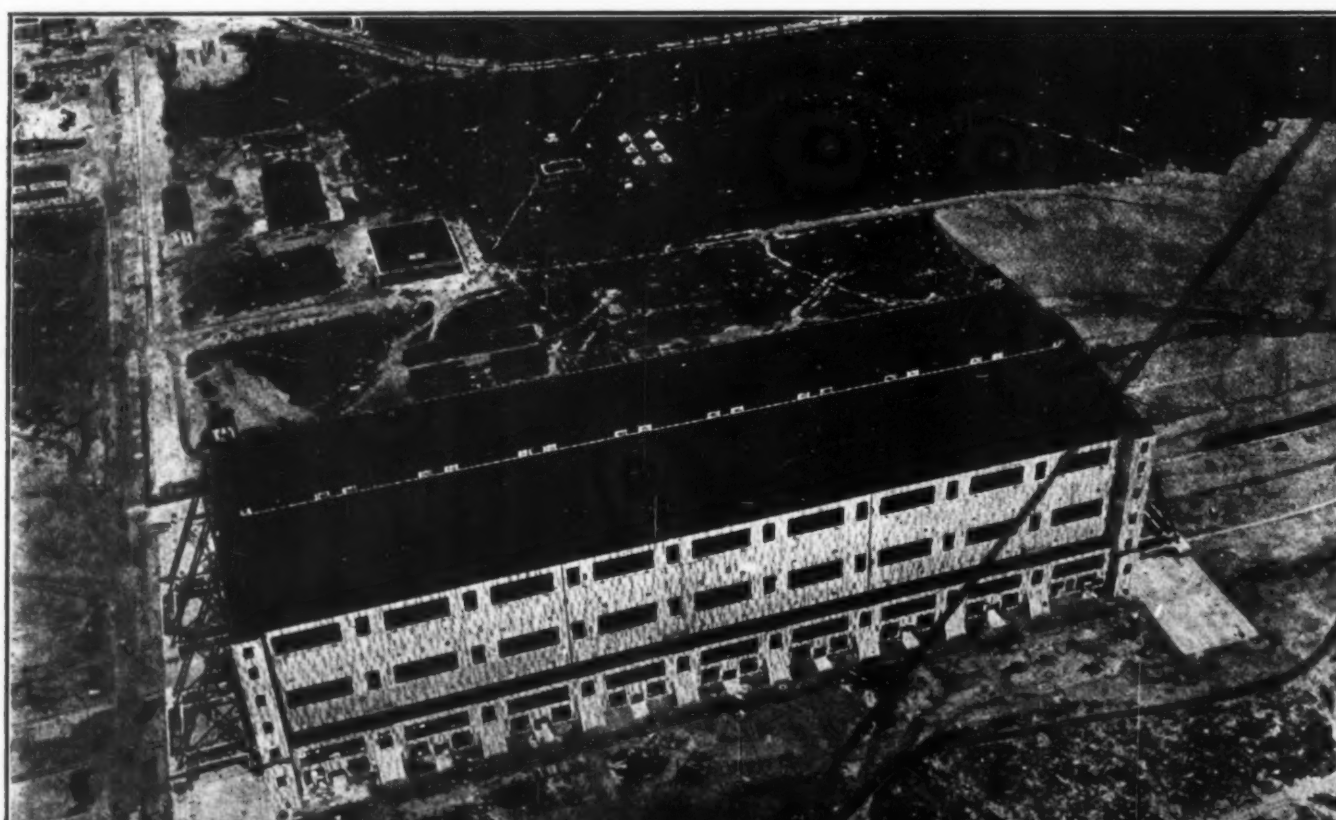
Built for the Ill Fated ZR-2, Huge Hangar at Lakehurst, N. J., Is Large Enough to Shelter Two Ocean Liners the Size of the Leviathan

NEAR Lakehurst, N. J., on a site owned by the United States Government comprising 1500 acres, is situated the new dirigible hangar and landing field, which was built for the home of the dirigible ZR-2, the largest airship in the world, which exploded in mid-air on Aug. 24 while on a trial trip in England. Not only will this act as dry dock for dirigibles, but it will serve as an airdrome in which the ZR-1, the first huge rigid airship to be built in this country, will be constructed. The hangar is 804 ft. long out to out of walls, 318 ft. wide out to out of wall intersection with the floor line, and 172 ft. clear height from floor to under side of trusses or 200 ft. from floor to roof of monitor. While it is difficult to visualize the enormous proportions from the dimensions, an idea of the size may be gained when it is considered that it is about as large as four Broadway blocks of fifteen-story buildings.

The hangar is of three-hinge arch steel truss construction, supported on steel towers 60 ft. from the floor level and consisting of 6800 tons of steel which were fabricated and erected by the Bethlehem Steel Corporation. The steel for the arches was first assembled in place on the floor of the hangar and lifted to place by 2 giant travelers. Running on tracks on top of the trusses were four smaller travelers which erected the purlins and bracing. Work under the two other main portions of the contract was performed by Irwin & Leighton, Contractors, who put in the foundation, floors and all the superstructure with the exception of the steel work. The Lord Construction Company was the contractor for all plumbing, heating and mechanical equipment of the interior.

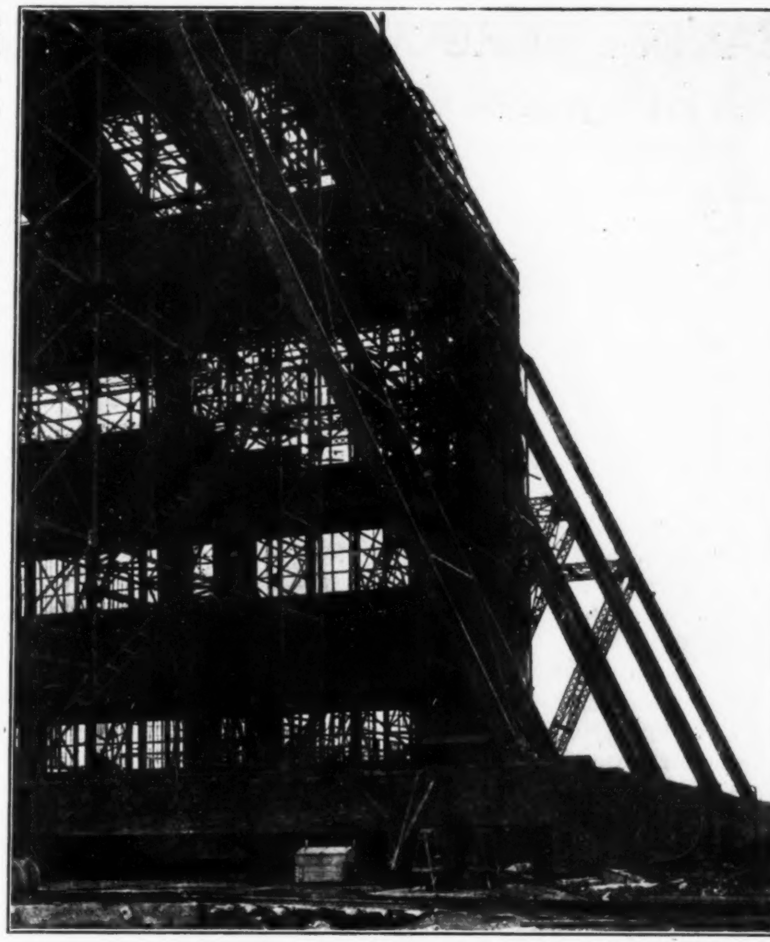
There are many novel features among the installation and equipment, each of which is a study in itself. Lighting of the interior is carried out with a flood light system from floors, walls and roof. Target lights are provided at each end for night landing. Search lights and target lights outside also will facilitate night landing. Heat is provided by an electric heating and blower system with tunnels running under the floor, both transversely and longitudinally.

There are three lines of standard gage railroad track running through the entire hangar. One is to the west field, 1500 ft., another to the east field, 2000 ft., and the third is a ¾-mile connection with the Central Railroad



THE HANGAR FROM AN ELEVATION OF 1000 FT. THE SMALL PHOTOGRAPH IN THE UPPER LEFT-HAND CORNER SHOWS THE BALLOON FROM WHICH A MEMBER OF THE STAFF OF SUCCESSFUL METHODS TOOK THE LARGE PHOTOGRAPH

of New Jersey main line. A docking rail trolley system is provided in three lines through the hangar, continuing 1500 ft. east and west of same, through the landing field. These trolleys are so constructed as to enable the dirigible when landing, to be moved on an even keel into the hangar or vice versa. The photograph at the bottom of the opposite page, taken by a staff representative of SUCCESSFUL METHODS from a kite observation balloon at an elevation of 1000 ft. in the air, shows the location of these tracks and docking trolleys.

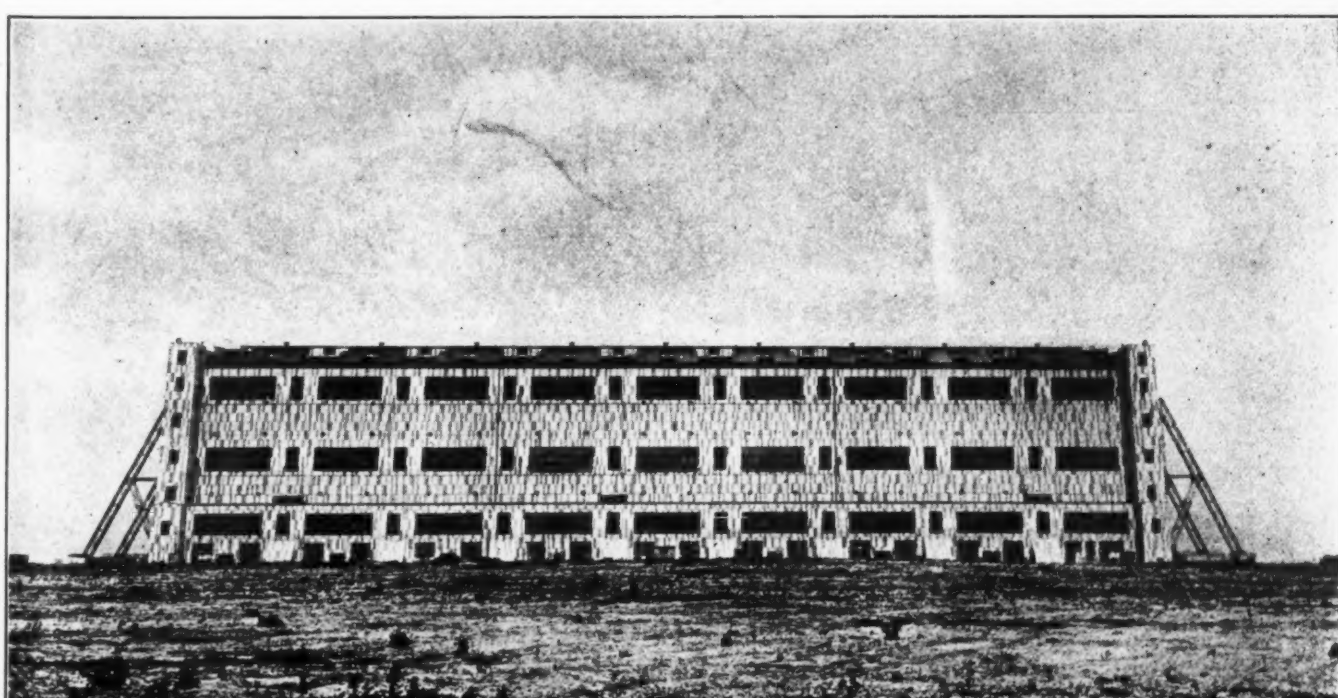


STEEL FRAMEWORK FOR ONE LEAF OF MASSIVE DOORS

The floor of the hangar is constructed of concrete base 8 in. thick, covered with asphalt blocks. All exterior walls are covered with asbestos corrugated sheathing of three different colors for the purpose of camouflage. The corrugated sheathing was so designed that each piece was numbered and erected accordingly. Window openings are of steel sash operated by electric motors and glazed with what is known as actinic (amber colored) glass. There are in all a little more than two acres of steel sash.

At each end of the hangar there are steel doors weighing 640 tons net. Each is 177 ft. high, 272 ft. wide, and 76 ft. thick at the base. The steel is covered with asbestos corrugated sheathing. The base of each door is encased and counterweighted with concrete. Each door leaf is carried on four trucks operated by 20 hp. motors and rolled on two 130 lb. rails. These rails are laid on concrete pile foundations each 530 ft. long and 9 ft. 4 in. wide. Each leaf is operated at a speed of 20 ft. per min. and can be operated by hand at the rate of 8 ft. per min. The doors when open form windshields.

Work was started in September, 1919, under Commander H. M. Eddy, who with his assistant, Lieutenant Marshall, are still officers in charge of construction. The hangar was designed by the Bureau of Yards and Docks under the direction of Rear Admiral C. W. Parks. Captain Frank T. Evans, son of the famous Admiral, "Fighting Bob" Evans, is Commander of the Station.



THIS IS THE WAY THE HANGAR LOOMS UP ON THE HORIZON

BREAKING THROUGH TO THE GULF

Construction Work Is in Progress on Waterway from Chicago to Illinois River, Building No. 4 Lock Near Marseilles

IN 1919 the State of Illinois authorized $20,000,000 worth of bonds to develop a 10-ft. waterway connecting the Chicago Drainage Canal near Lockport with the Illinois River near Utica, Ill., a distance of about 60 miles. The Illinois River will be deepened by dredging where advisable and canals constructed at other places. The completion of this project, which is set for 1926, will give a 10-ft. waterway from Chicago to the Mississippi River, and after the Mississippi River has been improved, to the Gulf. A series of 5 locks, 4 power houses and 4 dams are to be constructed as part of this project. The locks have a length of 600 ft. from gate to gate, or 938 ft. over all. They are 110 ft. wide and provide for 14 ft. of water over the miter sills. The lifts vary from 20 to 40 ft., depending upon conditions.

At the present time work is under way 2½ miles west of Marseilles, Ill., by Green & Son Co., contractors of Chicago, which covers construction of Lock No. 4, and about 700 ft. of canal approach. It will cost about $1,300,000.

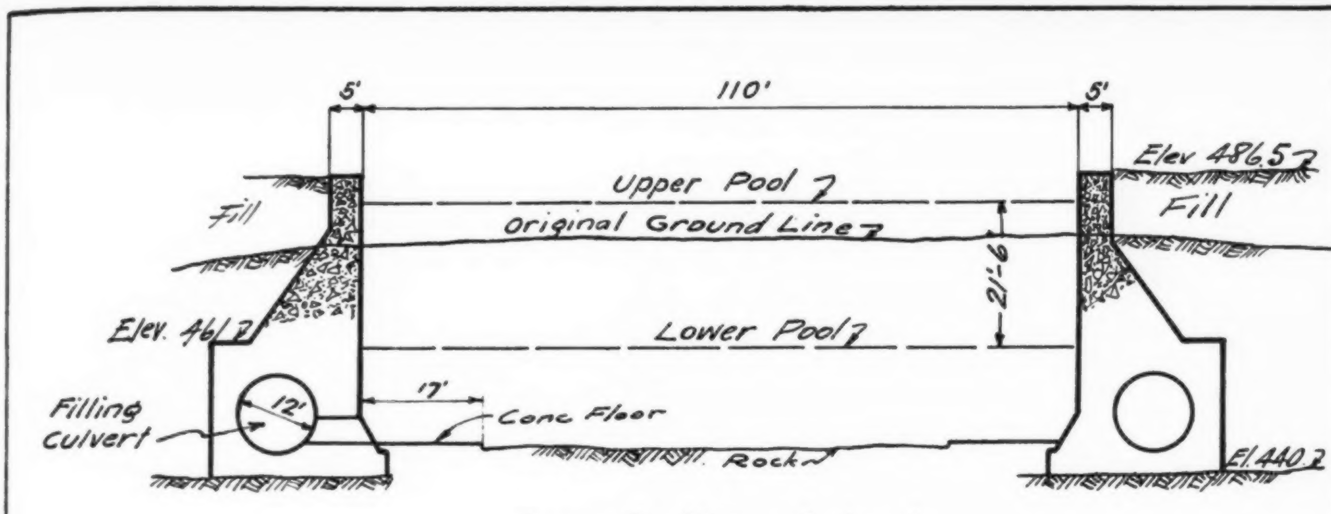
On account of the site being isolated from the railroad by the river (as is explained later) all the heavy equipment, such as steam shovels, locomotives, dump cars, etc., had to be brought overland from Ottawa, Ill., a distance of about 6 miles.

The steam shovels were towed by a 40 hp. road engine. The heavy shovel traveled on 30-ft. rails bridled together on 3-in. wood blocking. The rails were snaked ahead by teams. The remainder of the plant was brought out from Marseilles and handled across the river on pontoons.

The excavation amounts to 260,000 cu. yd. Of this amount 40,000 yd. was earth stripping to a depth of about 8 ft. The stripping was done with an elevating grader and dump wagons. The rock is hard shale and drilling is done on 10-ft. centers 20 to 30 ft. deep, and holes charged with 40 per cent gelatin. The photograph at the bottom of the opposite page shows one of the dinky locomotives hauling 3-ft. gage dump cars, being helped up a 10 per cent incline by a hoisting engine. To date about 90,000 cu. yd. of excavation has been made and at present there is a force of about 60 men. The picture at the bottom of the page shows the site of the lock and what the shovel is up against. Excavation to the depth of about 35 ft. is necessary and the material taken out is disposed of to bring the natural ground up to the level of the top of the lock or elevation 486.5 as shown in the cross section. The cross-section also shows the two 12-ft. diameter filling culverts built into the base of the walls.

Inasmuch as the lock is separated from the railroad by the Illinois River, a 1400-ft. span cableway was

SITE OF THE BIG LOCK AT MARSEILLES SHOWING STEAM SHOVEL AND 8 YD. 3 FT. GAGE DUMP CARS



Cross-Section of Lock

erected to handle coal, miscellaneous material and supplies. The mixed concrete will be taken across the river in ¾-yd. trucks over a temporary trestle so built that it can be taken out in sections when the rapid and frequent rise of the river or ice jams make it necessary. The cableway is used in the operation of removing the trestle.

A typical cross-section of the lock is shown above. Most of the forms will be of the traveling type. Concreting of the gravity walls of this lock which ranks with the largest structures of the kind in the country is expected to begin in September. The concrete plant, which is now in process of construction, is located across the river on a spur of the railroad. This plant, which will include two 1-yd. mixers, unloading trestle and facilities for handling bulk cement, will be in working order soon and will be described in a later issue.

The Department of Public Works and Buildings and of Waterways of the State of Illinois has charge of the designing and construction. M. G. Barnes is Chief Engineer for the department. Contracts covering the construction of other locks and canals probably will be let in the near future.

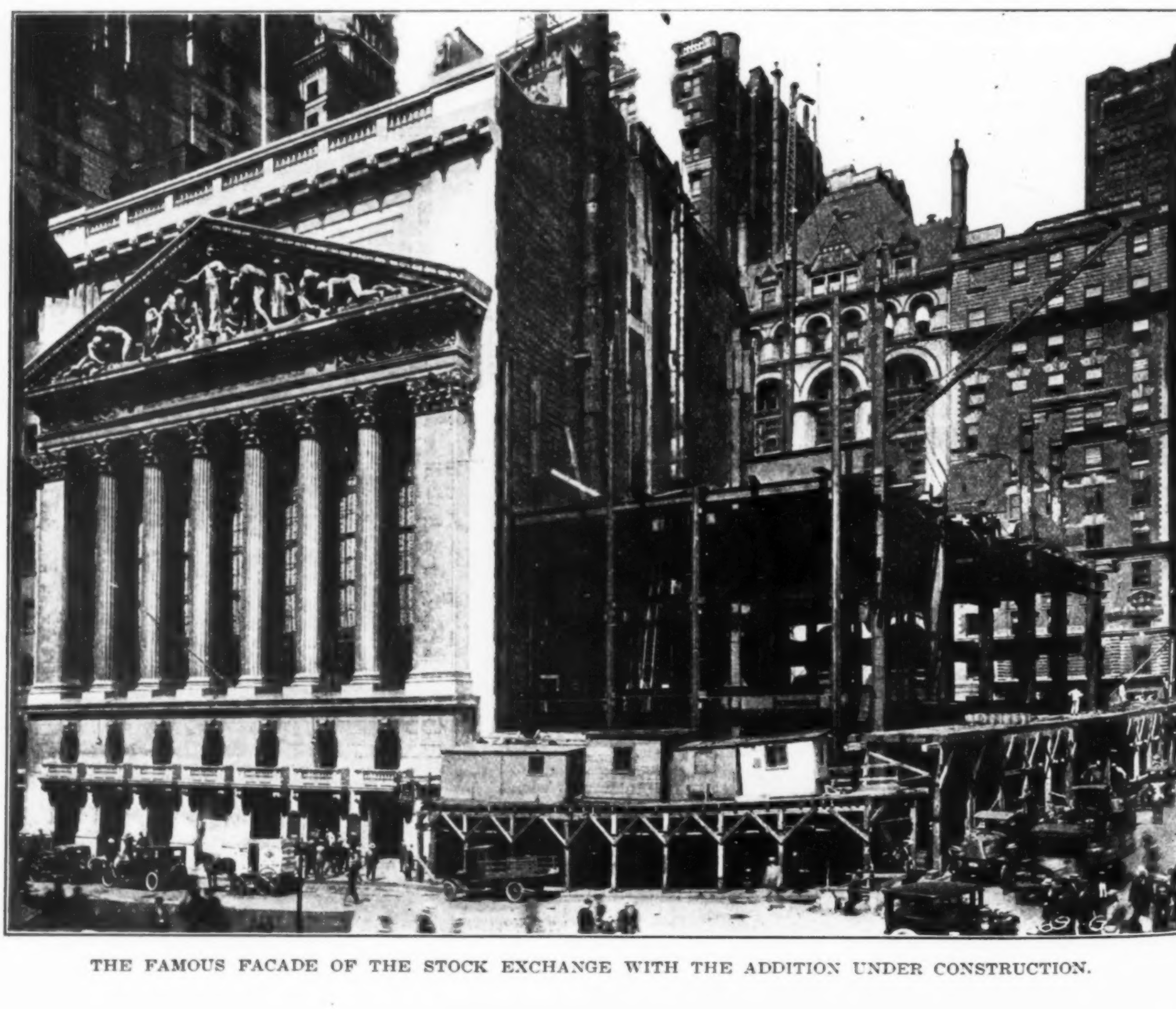
EXCAVATING FOR MARSEILLES LOCK. DINKY AND TRAIN BEING HELPED UP 10% INCLINE BY CABLE AND HOIST

MAKING MORE ROOM FOR THE BULLS AND BEARS

Novel Design Met With Modern Construction Methods in Building Addition to New York Stock Exchange

SPANNING the Board Room floor and carrying an 18-story building on top is the extraordinary feature of the design on the new 23-story addition to the New York Stock Exchange Building, which is now being erected at Broad and Liberty streets. The entire fifth floor is taken up by the trusses from which are suspended the third and fourth floors. From the bottom of the third floor to the Board Room floor level is 46 ft. 10 in. These trusses, which have a span of 77 ft. 9 in. and weigh 150 tons each, are easily the largest ever used in building work in New York City, and probably in the world. In erecting the trusses the steel work for the upper floors was used as false work. The lower chord was erected in three sections and placed on this false work. The web members were next put in place and the top chord lowered in three pieces. To handle this steel, specially made derricks tested to a capacity of 60 tons were used. An idea of the weight of these members may be gained when it is known that one section of the top chord alone weighs 45 tons. There are five basements below street level, the elevation of the lowest

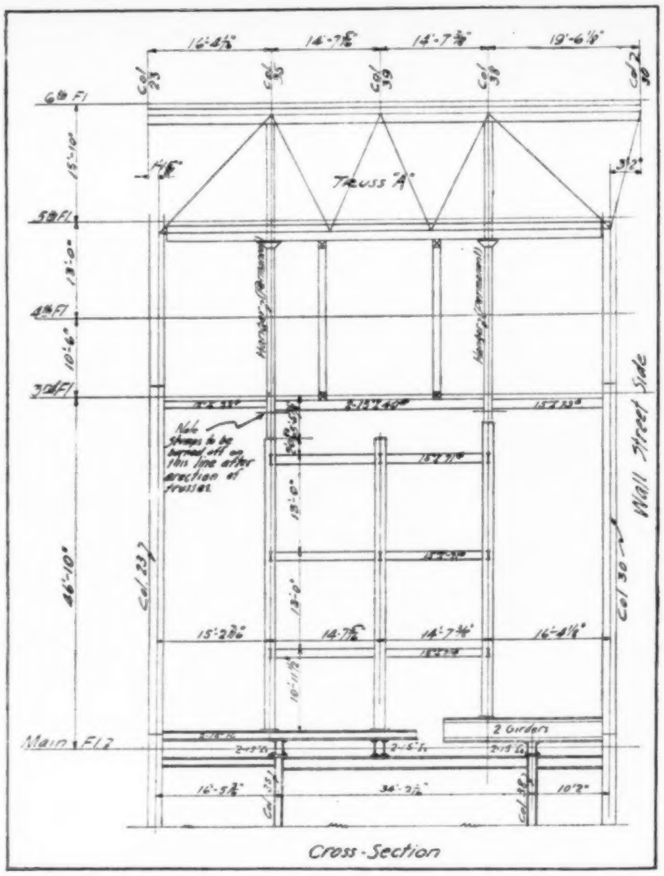
SOME INSIDE STUFF ON THE STOCK EXCHANGE JOB.



THE FAMOUS FACADE OF THE STOCK EXCHANGE WITH THE ADDITION UNDER CONSTRUCTION.

floor being 60 ft. below the sidewalk or 37 ft. 6 in. below mean sea level.

Another unusual feature of the design might be called the battered columns on the Wall Street side. The columns above the sixth floor are offset a distance of 3 ft. 2 in. toward the street over the columns from the main floor to the fifth floor. As the columns above the sixth floor are supported by the trusses before mentioned, it means that these columns on the Wall Street side are supported by the top chord of the trusses. A section of the erection plan shown on this page shows this so-called "battered column." This section also shows the temporary framing for shoring purposes. All members from the lower chord of the trusses to the girders at the main floor level with the exception of the hangers for the third and fourth floors shown in the cross-section, are temporary and later will be removed and made part of the permanent work above the sixth floor.



THIS SKETCH SHOWS HOW THE TRUSSES ARE SUPPORTED

Considering the unusual design, the special features and the cross-bracing below street level to be contended with, unusual speed was made by the Levering & Garrigues Company in fabricating and erecting the steel. Screeds for the grillages in the fifth basement were set May 1, 1921, and the derricks are now on the eleventh floor. The structural steel amounts to 6000 tons, and at the present time about 4500 tons are in place. The total cost of the building will be about $4,000,000. Trowbridge & Livingston are the architects and S. C. Weiskopf is the structural engineer. J. Metzger is superintendent for Marc Eidlitz & Son, who have the general contract.

Aside from the structural features of interest, this addition to New York's famous Stock Exchange is located at one of the most historical corners in the United States. It is diagonally opposite the United States Sub-Treasury, which stands on the site of the old Federal Hall, where George Washington took oath as the first President of the United States, April 30, 1789. It is not over 200 ft. from the spot where the tremendous bomb explosion in 1920 occurred, the origin of which still is unknown and shrouded in mystery.

The large photograph on the opposite page shows the existing Stock Exchange and the addition when preparations were being made to erect the big trusses. Most of the shoring was in place when this photograph was taken. The photograph on the cover of this issue of Successful Methods was taken on this job and shows the Wall Street side of the new building with Trinity Church on Broadway at the head of the street, in the background.

TEXAS HAS BIG ROAD PROGRAM

TEXAS is a State that is keeping its roadbuilding program up on a scale that would frighten some States in which distances are not so vast. Rollen S. Windrow, State Engineer, sends to Successful Methods the following statement of this year's work:

During the calendar year 1920 the State Highway Department approved of award of contracts for the construction of 1505 miles of state highways costing $18,750,089, of which amount $6,756,895 was State and Federal Aid and $11,993,194 was county funds. From Jan. 1, 1921, to July 31, 1921, additional contracts have been awarded for 653 miles, amounting to $9,210,333, of which $3,352,549 is State and Federal Aid and $5,857,784 is county funds.

The State now has 1106 miles completed; 2500 miles under construction, and 1000 miles included in projects advertised or in preparation. The total cost of the mileage included in all projects represents $48,793,000, of which amount $19,850,000 is State and Federal Aid, and of this Aid $8,555,689 has been paid to the counties for work performed up to Aug. 1, 1921. For the seven months during the current year the average monthly payments of Aid to the Counties has been $627,525, which with the county payments totals nearly $2,000,000 worth of work each month.

BRIDGING THE MISSOURI

THE State Highway Commission of North Dakota is building a bridge across the Missouri River, between Bismarck and Mandan. This structure consists of three steel spans 481 ft. long, a reinforced concrete viaduct approach about 400 ft. from the east bank and a similar approach about 1400 ft. long at the west bank. The bridge will have a concrete floor designed for vehicular and foot traffic as well as for an interurban railway.

ILLINOIS IS BUILDING EXPERIMENTAL ROAD

Six-Mile Stretch of Lincoln Highway Is Being Constructed by State Forces

ON the Lincoln Highway, beginning at the Cook County line, 6 miles of concrete road are being built by the Illinois State Highway Department, which is known as the State's experimental road. Stone from the State Penitentiary is used and the entire plant is owned by the State. A central mixing plant with a six bag mixer and with bins charged by clamshell is located at the Michigan Central Depot at Frankfort, Illinois, about $1\frac{1}{2}$ miles from the highway. It is centrally located for the 6-mile stretch of road. The construction plant on the road itself, includes steel forms, tamping machine and a subgrader.

THIS TRUCK HAS A FALSE BODY TO FACILITATE THE DUMPING OF CONCRETE.

In addition to experimenting in methods and cost, the reinforcing used is also a new departure and is designed to give what is known in the department as a flexible pavement. The photograph at the bottom of this page shows the $6\frac{1}{2}$-in. strip of corrugated iron which runs lengthwise down the center. One-half inch round bars 5 ft. long on 10 ft. centers are placed through this corrugated iron strip at right angles to it, and running lengthwise in the center of the slab and 6 in. from the edge are $\frac{3}{4}$-in. round bars. The slab is 7 in. thick throughout and has a width of 18 ft.

Various types of trucks are used to transport mixed concrete from the central mixing plant. The plant has a capacity of 700 ft., but to date the maximum day's work of 10 hours is 560 ft. The force consists of 10 men dumping and spreading; 8 men covering and watering; 10 men preparing subgrade; 2 foremen and 12 trucks. The work is progressing satisfactorily.

PREPARING THE SUBGRADE. THIS PHOTOGRAPH SHOWS THE STRIP OF IRON USED TO MAKE THE ILLINOIS "FLEXIBLE" TYPE OF CONCRETE PAVEMENT.

Building Roads in San Domingo

The upper photograph shows the character of the jungle through which the roads are built. At the left is a bridge on one of the main highways. Below is a payday scene. American machinery was used in this work

MODERN METHODS IN MASSACHUSETTS

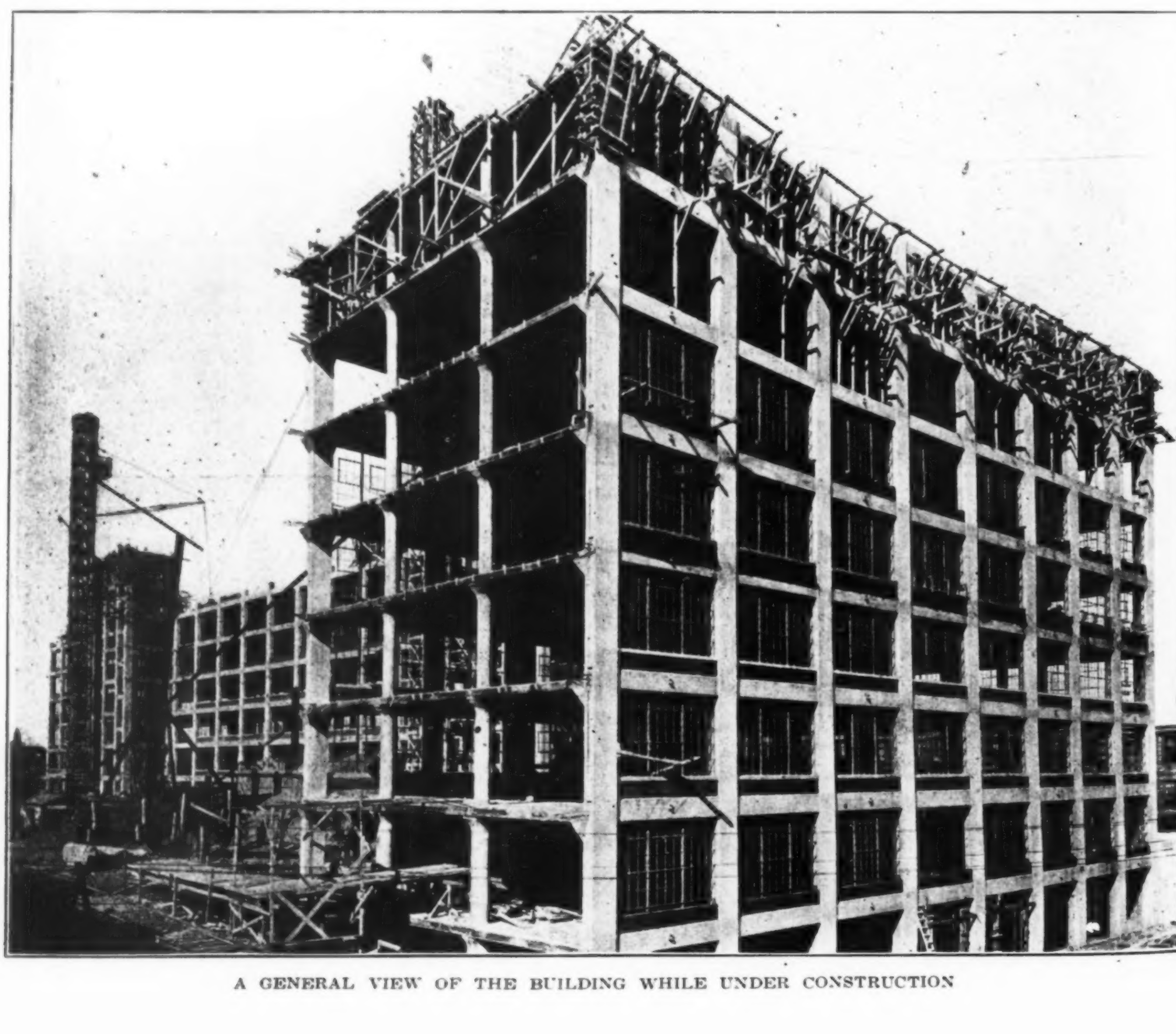
Careful Planning Proves Its Worth in Construction of Important Unit in Shoe Industry at Lynn

THE plant recently completed for Hilliard and Merrill, Incorporated, on Eastern Avenue, Lynn, Mass., is the largest fireproof unit in New England designed solely for the purpose of providing a central storage point for hides and cut soles with an excess of floor area available for rental to manufacturers of shoes.

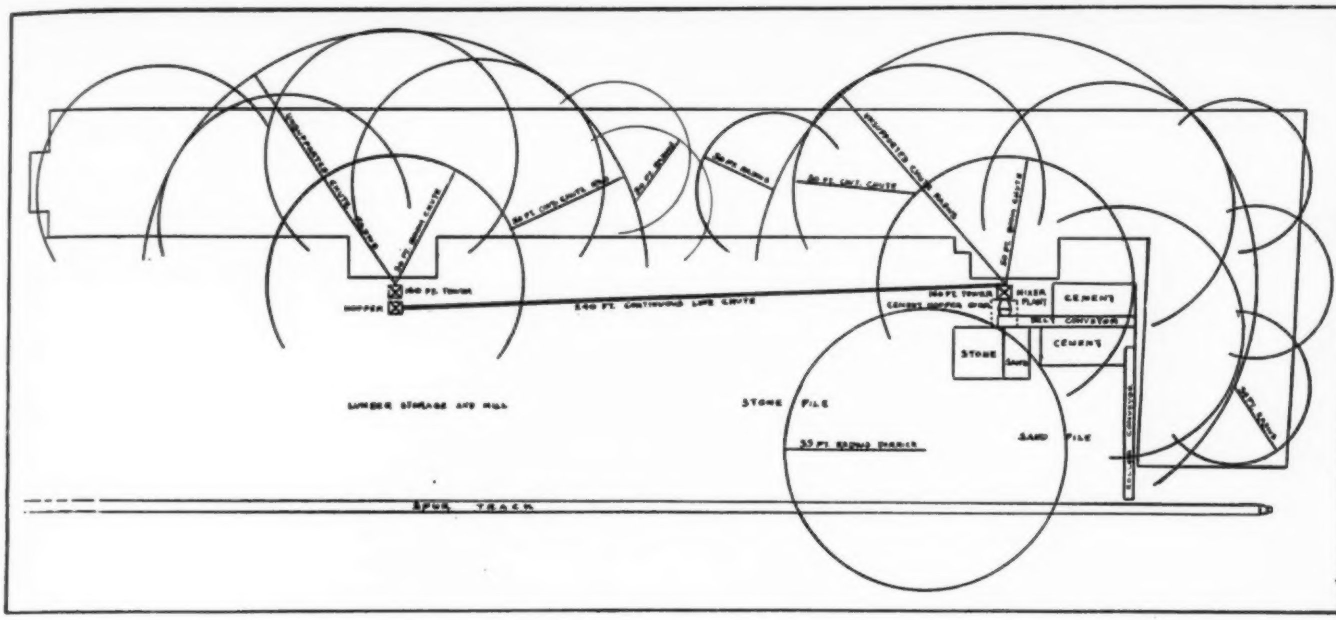
The structural frame, floors and roof of the building are constructed of reinforced concrete with brick curtain walls and brick interior fire walls. There are two rows of round interior columns with capitals and plinths supporting flat slab floors. The exterior wall beams are carried above the slabs to allow of maximum window heights. The story heights are 12 ft. in the clear throughout. The reveal on interior side of curtain walls is of sufficient depth to keep radiators, risers and returns from protruding beyond the interior faces of pilasters, thereby giving an unbroken wall line.

As the floors throughout the building were to be subjected to exceptionally severe wear, special tests were made to determine the finish best adapted to the conditions. Four wooden boxes, mounted on small steel wheels, were attached to wood arms, held in a central vertical shaft with worm gear and driven by motor, so that they revolved on a radius of about 7 ft. These boxes were weighted with sand and tests to destruction were made on various kinds of concrete finish. The first sample of ordinary granolithic floor finish lasted 5 min., while the sample finally selected stood up for over 30 hr., without appreciable wear. It was estimated that 1 hr. of the test was equivalent to 1 year of exceptionally hard wear such as the floor would receive along aisles and in front of freight elevators.

It was found that the wearing action of the wheels on tractors, trailers and trucks carrying racks of cut soles produced a rotary grinding when turning and had a far more injurious effect than the general wear. As the wheels on the sand boxes were not pivoted, the test subjected the samples of finish to a continuous wearing action similar to that resulting from the trucks in turning. It was discovered that the floor to be



A GENERAL VIEW OF THE BUILDING WHILE UNDER CONSTRUCTION



PLAN OF THE SPOUTING SYSTEM

properly protected needed a lubricant so that the wheels could not dig in and pry out the aggregates while turning. Water glass was used as a protective coating.

The method of laying the finish finally selected and used throughout the plant consisted of first picking and thoroughly cleaning surface of slab, applying a sand and cement cushion to fill irregularities in the slab, and then putting down about one inch of graded trap rock and cement. The whole was subjected to successive rollings by solid concrete rollers weighing 1800 lb. Only the briefest time was spent in troweling. After a set of several days, the heaviest type of rotary electric floor grinders were used to run over and smooth up the surface. When finished, the floor resembles terrazo in general appearance, except that the interstitial spaces are reduced to a minimum approaching as near as possible a solid trap rock surface.

As in all construction work of any magnitude, the problem of manufacturing and handling concrete was of utmost importance both in respect to economy and speed in operation. Careful study was given to laying out of the concrete plant, unloading and storing aggregates and handling and placing of the mix. The total yardage of concrete amounted to over 10,000 yd.

A central plant, consisting of bins, cement shed, mixer and tower, was located in the court at the junction of the two wings. This enabled the Eastern Avenue wing and a portion of the long wing to be spouted from this tower, the radius covered by quick-shift chutes and counterweight chute being 130 ft. A relay tower was located at Tower Two. In this manner the entire floor area was tributary to the chutes from these two towers. Concrete was buggied from the relay tower to the boiler house and tank. All concrete for the plant, with the exception of that for the footings, was produced by the central mixing plant. It is of interest to note that this was the first plant of its kind in Massachusetts where concrete was spouted by means of counterweight-chutes.

The material bin consisted of compartments for gravel and sand properly proportioned with a capacity for one day's run. Bag cement was unloaded on gravity conveyors and bulk cement was shoveled into hopper outside of car from which point it was handled to bin by clam shell bucket. Sand and gravel were fed direct to measuring hopper. Cement was fed into hopper in floor of cement shed and by belt conveyor to auxiliary bin located over mixer hopper and equipped with an agitator. The cement was measured automatically by means of gates in vertical chute. The dumping lever of the mixer was extended to reach above the charging floor at top of charging hopper of the ¾ yd. mixer.

The labor required for the operation of this plant consisted of two men at charging platform, two men feeding cement, one man handling empty bags, when bag cement was used, one hoisting engineer and one fireman. One engineer on derrick and one tagman unloaded sand and gravel from cars to bins.

A cylindrical bag shaker rotated by belt from motor was made at the site and performed excellent service as shown by weights of shaker sacks approaching closely the original weight of empty sacks, when new.

All centering and form work was designed in detail and schedules compiled covering deliveries. Lumber was piled near the mill and separated in piles labeled with mark, size and lengths, and use. The process of making forms was considered as an independent manufacturing process. A new method of plinth suspension was developed which greatly simplified stripping around column heads and eliminated shoring of plinth panels.

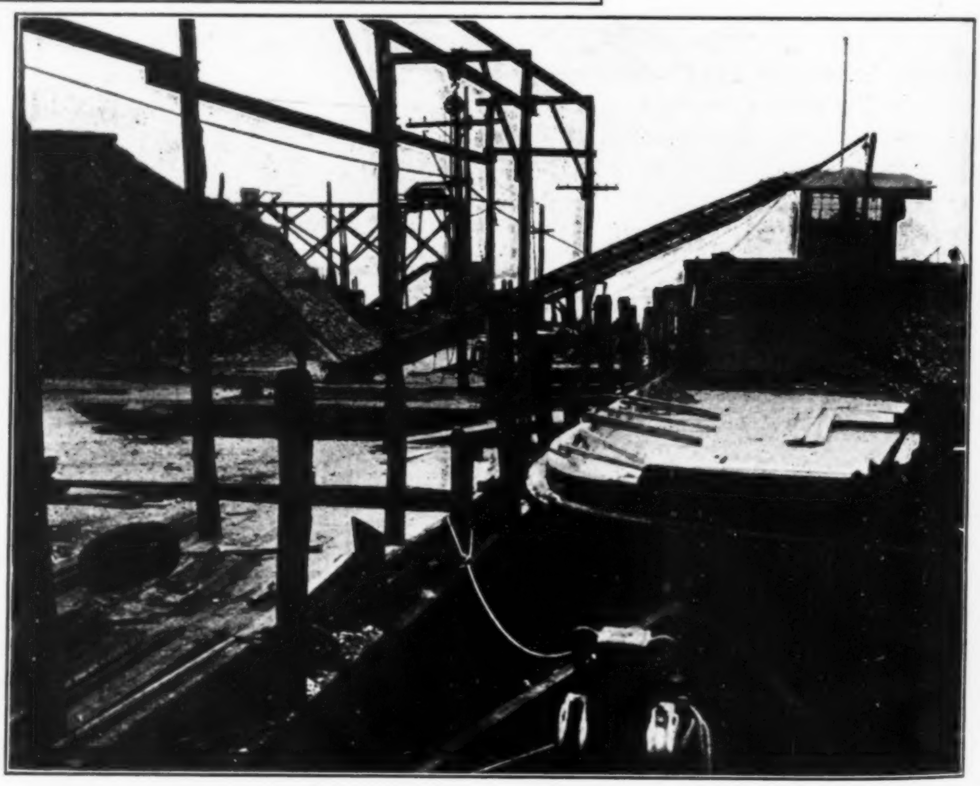
Sand and gravel were unloaded from cars by derrick and clamshell bucket of ¾-yd. capacity. Brick was unloaded from trucks to rectangular wooden platforms on cleats. These platforms, when loaded, were picked up in the yard by tractors, run on material hoists and deposited where required. This procedure, not only protected the brick, but insured an efficient and economical method of handling. Steel sash was dipped into shallow tanks containing waterproof paint before they were set. Two coats were applied in this manner.

C. H. Nichols represented the owners in the field and John M. Tobin was the construction superintendent for the contracting engineers, William M. Bailey Company of Boston.

PLANTING OYSTERS

The Portable Conveyor Plays a Part in an Unusual Business

ALTHOUGH this title is somewhat of a misnomer, it is the usual term in the oyster trade for the work of depositing upon the bottom of Long Island Sound the old shells from the previous year's "crop." The oyster spawn, microscopic in size, appears in late June or early July floating on the surface. During its early existence this bit of plasm steadily absorbs from the sea water the mineral salts which gradually become its shell. In a few days enough embryonic shell has formed to cause the oyster to sink to the bottom. If it lands in mud or sand, its young life is over, but if it finds a clean, rocky bottom, it quickly attaches itself and sets up housekeeping. To eliminate the gamble in this housing location and to lessen the infant mortality H. C. Rowe & Company thoughtfully provided a layer of clean empty shells over certain of their beds every June and July, and for more than fifty years their increasing prosperity has seemed to indicate the wisdom of this intensive culture, which has now become the general practice.



The tonnage of empty shells handled constitutes a real problem aggravated by the fact that oyster shell is exceptionally abrasive and will file a shovel down almost with the speed of an emery stone. Belt conveyors are the best solution that H. C. Rowe & Company has found. The illustrations show a battery of five belt conveyors loading empty shells. With this layout a barge, which by hand wheeling took 26 men 8 hours to load, is being loaded by 6 men in 4 hours.

A full-grown marketable oyster usually has five years to its credit, during all of which it is subject to assaults and indignities equal or more terrible than those known to the human race. Those that do survive are then dragged from their homes by rakes operated by power winches, emptied into the hold of a sea-going power barge and taken in to the shucking tables, canning and refrigerating plants. The unloading of the barges also is done by conveyors.

IT CAN DO EVERYTHING BUT VOTE

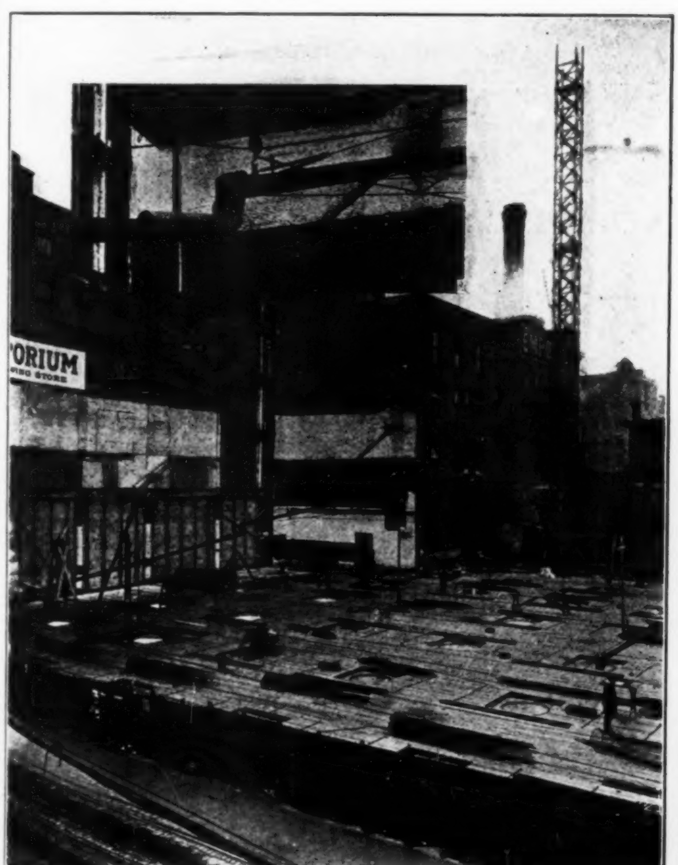
AN old-time Irish "humper" or station man when watching a steam shovel at work once remarked that the only defect that he could see was that it couldn't vote, which in his opinion was a grave fault in a dirt mover. The accompanying photograph was taken on a job at Loudonville, Ohio, and illustrates the versatile nature of the machine.

This particular shovel was delivered at Loudonville, to be used on a road project by the Ohio State Highway Department and reached the site before the other equipment was ready. A channel change in the little stream shown was necessary before the road could be built. Also a bridge had to be torn out and abutments for a new bridge made.

The shovel went to work, altered the channel, tore out the bridge, made the excavation for the abutments of the new bridge and proceeded on its way through a wheat field back to the roadway. One week was consumed in this work. A hard job was finished, and the steam shovel lost no time. The continuous tread with which the shovel is equipped enabled it to negotiate the perils of the Ohio mud.

CABLE SUPPORTS CHUTE

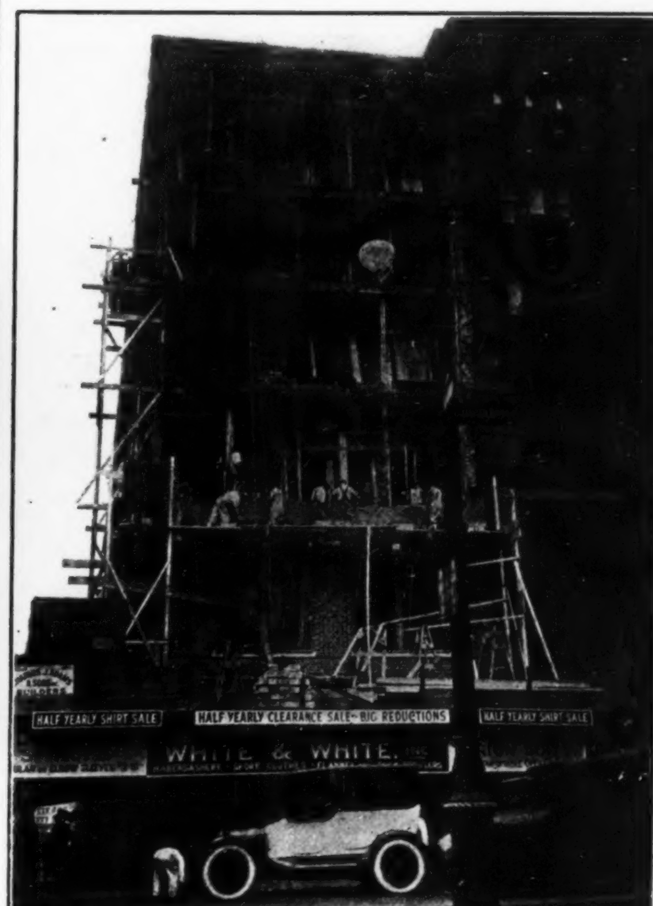
ON a building job in St. Paul, Minn., James Leck devised an unusual plan for supporting the end of the second 50-ft. section of chute. A ¾-in. cable was stretched from the steel columns of an adjacent



building to a gin pole on the opposite side of the work, the cable being supported every 40 ft. by a smaller pole. The chute was then attached to the cable as may be seen in the photograph accompanying this article. It worked excellently.

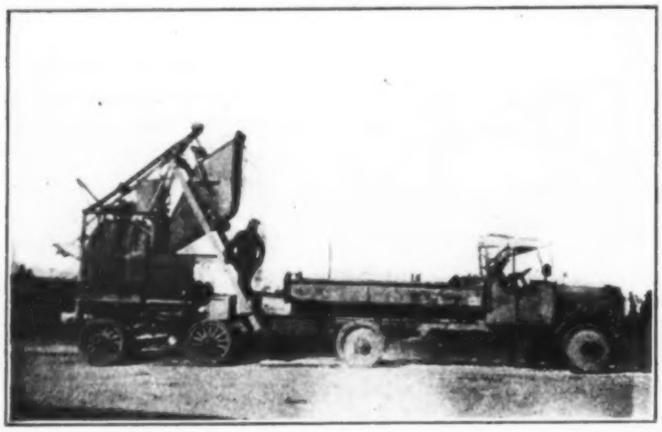
BUSINESS AS USUAL

THE photograph illustrates the manner in which alterations are carried on with as little interference as possible to the tenants of a six-story brick building at Worth Street and Broadway, New York City. Charles A. Adams Sons, builders, are putting up a new brick wall. Temporary tar paper partitions with temporary windows to allow business to be carried on as usual are clearly shown in the photograph.



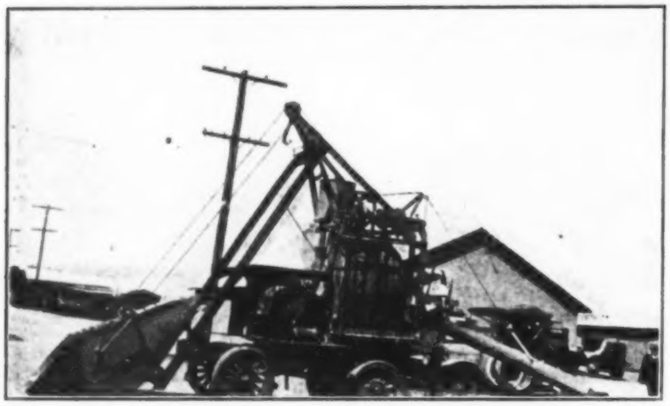
A MOBILE MIXER

IN order to have a concrete mixer which can be quickly transported from place to place, Walter B. Cannon, superintendent of shops for the Highway Commission of California at Lankershim, California, has mounted a



building mixer on a condemned 3-ton motor truck chassis. By rigging up a special frame the power loader skip can be lowered to the ground for wheelbarrow loading. The distributing spout is fastened in place under the discharge chute of the mixer. The mixer is run by a gasoline engine mounted on the frame with it. The radiator and water tank can plainly be seen in the photographs.

This mixing plant is hauled about by a motor truck



and is used on a variety of work along the highways of California. Its greatest advantage is that it can make long jumps at the speed of a truck without any of the trouble and difficulties which usually are encountered in handling and moving a mixer.

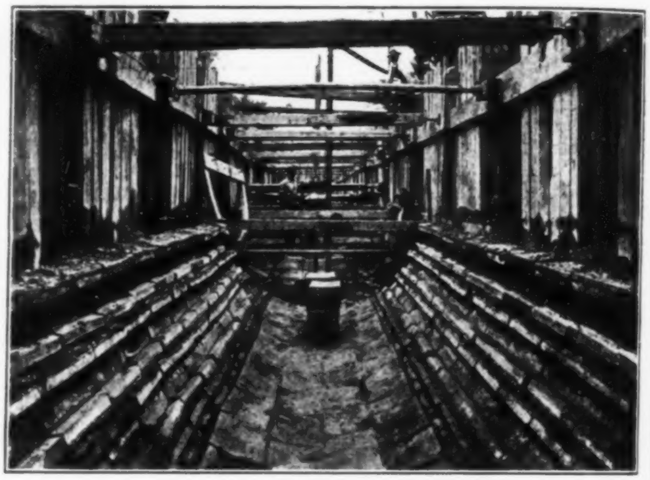
DISPOSING OF 150,000 CUBIC YARDS OF EXCAVATION

TO dispose of earth by digging a trench to put the earth in at first seems somewhat illogical. However, this is the method used by the T. J. Forschner Co. to dispose of 150,000 yd. of excavation for the new sewage disposal plant at 125th Street and Cottage Grove Avenue, Chicago. The excavated material was loaded on dump cars and hauled to a site 200 ft. wide by 1300 ft. long, set aside for this purpose. A trench was dug parallel to the unloading track by means of a drag line. The dump cars dump into this trench and the material is handled over the disposal site in uniform layers by means of the same drag line.

SEGMENT SEWER BLOCKS

AN 8-ft. sewer being built in a trench which is never completely unwatered is shown in the accompanying illustration and is made possible by the use of segment blocks. Green & Sons Co., contractors, Chicago, are doing the work, and the photograph clearly shows the water with which they have to contend. The outer ring of block laid in the invert of the sewer automatically produces a perfect subdrain. The segment blocks are vitrified and are of sufficient size and strength to hold their position until the inner blocks (some of the blocks for the inner ring may be seen stacked up) are set.

The merit in this system of sewer building lies in the



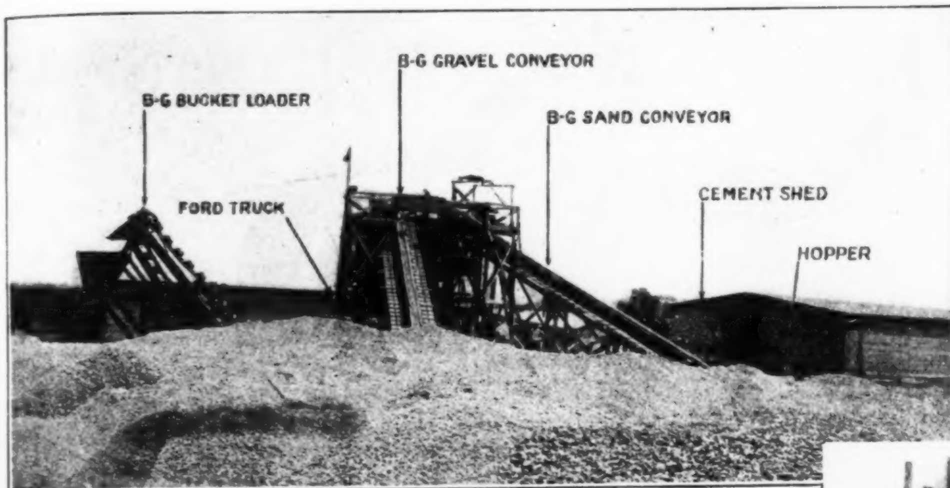
fact that it may be used where brick or concrete could not be employed without completely unwatering the trench.

CLIPPING REINFORCING BARS WITH A TORCH

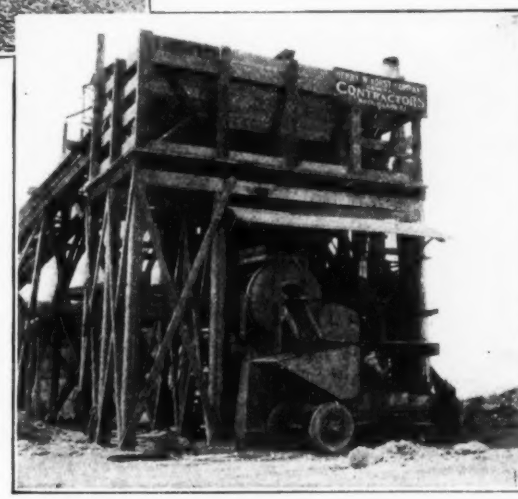
GETTING rid of the projecting ends of reinforcing bars when finishing concrete work often proves a tedious sort of job, but a New York contractor has solved the problem most effectively. One of the men arms himself with an oxy-acetylene torch and attacks the projecting bars. The torch clips them off in a flash and he moves along with only a moment's delay for each operation. This method, in addition to its speed, has the advantage of clipping off the bars flush with the concrete without injuring the concrete itself in the slightest degree.

NON-STEALABLE SHOVELS

THE repair department of the Chicago Surface Lines employs a simple and effective method of preventing hand shovels from being stolen when they have to be left in the city streets during the night. When the men knock off work the foreman takes a chain, runs it through the opening in the handles of the shovels and locks it around a trolley pole. As many as 20 shovels can be strung on a chain in a ring around one pole and they are sure to be there in the morning when the men come back for the next day's work. The only flaw in the scheme is that it cannot be used to keep the picks from disappearing.



Motion pictures of this and other road jobs are available. Our nearest representative will be glad to show them to you. Write us if you wish to see this job in action.



Handle Sand and Gravel With B-G Conveyors at Central Mixing Plant

Derricks have been replaced by two Barber-Greene Belt Conveyors in a central mixing plant successfully developed by the Henry W. Horst Co., on the Mt. Vernon Road near Cedar Rapids, Ia.

One conveyor carries the sand and the other the gravel, taking the material directly from trucks or from nearby storage piles.

A B-G Loader loads trucks with sand and gravel from the storage piles. The trucks carry a short distance and dump into the conveyor hopper. Sand and gravel is also hauled from Cedar Rapids in large trucks and dumped directly into the conveyor hoppers.

Cost of handling sand and gravel with B-G Conveyors:

1—Conveyor engineer	$.55. per hour	$4.95
1—Sand conveyor tender	.45 per hour	4.05
1—Gravel conveyor tender	.45 per hour	4.05
1—Helper	.45 per hour	4.05
10—Gals. of gasoline	.20 per gal	2.00
2 Quarts of oil	.60 per gal	.30
		$19.40

Unit cost $\frac{19.40}{900}$ = .021 per sq. yd. of pavement.

Cost of handling sand and gravel with B-G Loader:

1—Loader operator	$.55 per hour	$4.95
7—Gals. of Gas	.20 per gal	1.40
1—Quart of oil	.60 per gal	.15
		$6.50

Unit cost $\frac{650}{900}$ = .007 per sq. yd. of pavement.

Photographs of this job will be furnished on request. Write for them Today.

Barber-Greene Company

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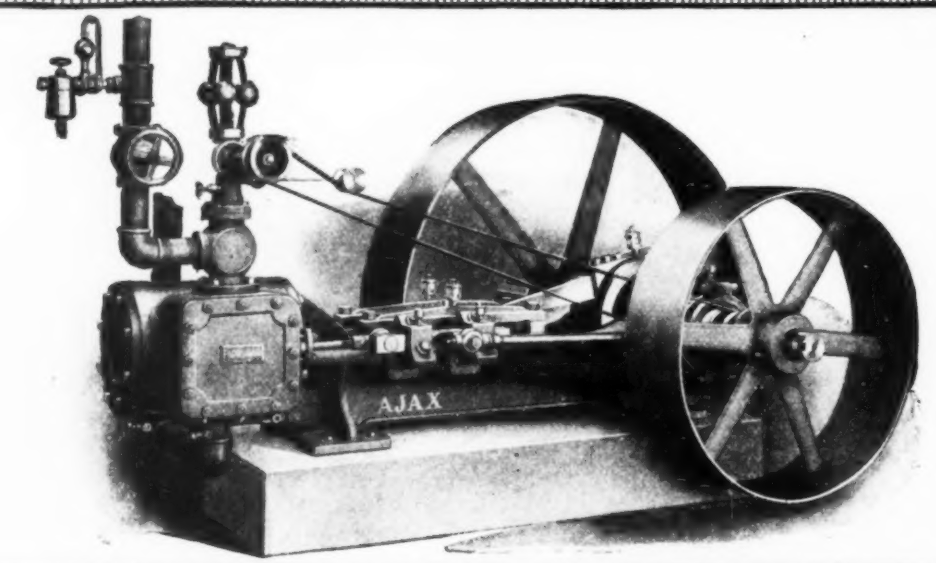

The Farquhar Ajax Center Crank Engine

The All-Purpose Power-Unit

For

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Sand or Coal
Any other machine requiring belt power
also
steam from boiler for quarry drilling, etc.

See These Construction Points:

CRANK—Farquhar Cranks are machine ground from open hearth, solid steel forgings, thus insuring absolute accuracy. Cranks for engines 10 horse power and larger are regularly supplied with balancing disks. Balance Cranks can also be furnished on special order on smaller engines. The main bearings for the crank shaft are made specially large and strong, and babbitted with special bearing metal. The different pieces are adjustable and any wear can easily be taken up.

PISTON—Our Piston is a hollow iron casting, grooved in the head to receive the rings. Rings which are cast iron of the self-adjusting variety are sprung into place. These rings are ground after being cut apart, thereby making a perfect fit in cylinder.

CONNECTING ROD—The rod proper is forged from a solid piece of steel. On each end are two steel forged straps holding a bronze box. The box is kept tight by a wedge running between the end of the rod and the box. A bolt with lock nut on the end, runs clean through the straps and the wedge.

CROSS HEAD—The Cross Head is one of cast iron with accurate machined pin. It is adjustable on the Piston Rod by means of lock nuts. The Cross Head Guides on the engine frame are also adjustable, and supply the means for taking up the wear on the Cross Head.

MOUNTING—Our Ajax Engines are now made with flat saddles. When mounted, they set on steel saddles securely riveted to boiler. The engine is bolted to the boiler saddle and can be easily removed for moving the outfit or for detached use. In addition to the greater convenience, the new style mounting also makes a much stronger and a more solid job.

TESTING—When complete, every Farquhar engine is belted up to a pony brake and subjected to from a three to a five hour test under the most severe conditions. After going through this test, it is reasonably certain that when the engine reaches the user, it will run smooth and free from knocks. Also that there will be no hot crank or connecting rod boxes.

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